EXHIBIT J

Supplemental Report of Jonathan Rodden, PhD and Jowei Chen, Phd:

Assessment of Plaintiffs' Redistricting Proposals

Missouri NAACP v. Ferguson-Florissant School District

1. We have been retained as expert witnesses for the defense. The details of Professor Rodden's background and compensation are included in his original report in this case. Jowei Chen is Associate Professor of Political Science at the University of Michigan, a Research Associate at the Center for Political Studies, and a Research Associate at the Stanford Spatial Social Science Lab. He received a M.S. in Statistics from Stanford University and a Ph.D. in political science from Stanford University. His academic areas of expertise include spatial statistics, districting, legislatures, elections, and political geography. He has published several papers on political geography and districting in top political science journals including *The American Journal of Political Science* and *The American Political Science Review*. He has substantial expertise in the use of computer algorithms and geographic information systems (GIS) to study questions related to political and economic geography and districting. He is being compensated at a rate of $300 per hour for his work on this report.

2. In this supplemental report, we respond to the expert report of Mr. William S. Cooper. Mr. Cooper's report does two things. First, it provides some demographic background information about the population living in the Ferguson-Florissant School District. Second, it proposes two alternative districting plans that would divide the Ferguson-Florissant School District into seven winner-take-all single-member districts, with the express goal of generating "four majority-Black districts" (paragraph 9).

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3. This supplemental report does two things in response. First, it clears up some potential confusion associated with rather different population statistics presented in different parts of Mr. Cooper's report and in the expert report of Professor Gordon. Second, since African Americans already constitute a majority of the voting-age population of the existing at-large district and are in a good position to elect candidates of choice under the existing system, it is important to examine whether the transition to a system of single-member districts would in fact dilute the voting power of African Americans. Based on the available information—past voting for African-American candidates and past turnout of African Americans—our analysis indicates that a transition to the smaller winner-take-all districts proposed by Mr. Cooper would, if anything, undermine the success of African American candidates.

DEMOGRAPHICS

4. The Plaintiffs' reports take a number of different approaches to the rather basic question of whether whites make up a majority of the overall and voting-age populations in the Ferguson-Florissant School District. In the body of his report, Mr. Cooper uses data from the 2010 United States Census and concludes that "non-Hispanic Whites" are "the largest racial group in terms of voting-age population." He cites a figure of 48.95% for whites and 48.19% for African Americans. Professor Gordon indicates that African Americans only make up only 44 percent of the *overall* population in Table 1 of his report, while Mr. Cooper presents a figure of 54 percent (Figure 2). Moreover, when one reads further into Mr. Cooper's report, the tables in Exhibit D indicate that African-Americans make up 55 percent of the total population, while non-Hispanic whites make up only 41.3 percent. On the crucial question of voting-age population, if one sums over the age groups in Table 6 of Exhibit D, the result is at odds with the

conclusion in the body of the text, and indicates that African Americans are a majority of the voting-age population.

5. The discrepancy between the body of the text in the Cooper report and Exhibit D is driven simply by the fact that the body of the text uses census counts that are out of date, and Exhibit D uses the more current data from the 2011-2013 American Community Survey. These data were also used to make the graphs in Rodden's initial report. As Mr. Cooper's report shows very clearly, e.g. in Figures 4 and 5, the population is rapidly transforming, and it is crucial to use the most current data.

Table 1: 2011-2013 American Community Survey 3-Year Estimates

		Population	Margin of error	% of Total Pop.	Voting-Age Pop.	% of VAP
1	Total	66758	2775	100.0%	49009	100.0%
2	White alone	28160	1789	42.2%	23740	48.4%
3	White alone Hispanic	573	NC	0.9%	498	1.0%
4	African American alone	35087	2458	52.6%	24313	49.6%
5	Am. Indian & Alaska Native alone	85	122	0.1%	NA	NA
6	Asian alone	544	273	0.8%	NA	NA
7	Native Hawaiian & Pacific Islander alone	0	104	0.0%	NA	NA
8	Some other race alone	686	470	1.0%	NA	NA
9	Two or more races, some part Af. Am.	1564	NC	2.3%	681	1.4%
10	Two or more races, no part Af. Am.	632	NC	0.9%	275	0.6%
	Additional aggregates:					
11	White alone non-Hispanic	27587	1717	41.3%	23242	47.4%
12	Any-part African American	36651	NC	54.9%	24994	51.0%
13	Any-part Af. Am. plus White Hispanic	37224	NC	55.8%	25492	52.0%
14	All Minorities	39171	NC	58.7%	25767	52.6%

Source: U.S. Census Bureau, 2011-2013 American Community Survey and author's calculations

Note: Population estimates and margin of error for white alone, African American alone, American indian and Alaska Native alone, Asian alone, Native Hawaiian and Pacific Islander alone, and some other race alone are from Table C02003. This table also includes some details on respondents reporting two races, including those who report both white and African American, and those who report both American Indian & Alaska Native and African American. These have been added together in line 9. The remainder of all of those reporting two or more races is displayed in line 10. It is possible to obtain data on Hispanic or Latino origin by consulting Table C03002, which provides data on white alone Non-Hispanics, reported in line 11. Line 2 includes Hispanics, and thus white alone Hispanics (line 3) can be calculated by subtracting line 11 from line 2. In order to obtain data on voting-age population, it was necessary to consult ACS tables on sex by age, which includes three categories. I have summed over the categories "18 to 64" and "65 and over." Age breakdowns for very small racial groups were unavailable. Table C01001 provides the number of over-18 non-Hispanic whites, and thus it is possible to back out the number of Hispanic whites by subtracing this from line 2. Aggregate voting-age totals are reported for "two or more races," but detailed breakdowns of race by age are unavailable. However, from the first column, we know the proportion of all those in the overall population reporting two or more races for whom one of the reported races is African-American (71 percent). Thus it is sensible to apply this same percentage to the voting-age population, which produces the VAP estimates in lines 9 and 10. Note that confidence intervals are only reported for estimates that came directly from the ACS and did not involve author calculations.

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6. Since the initial Rodden report relied on graphs and did not provide data on Hispanics or breakdowns for individuals reporting more than one race, Table 1 helps clear up any confusion by presenting the most relevant figures in detail. Mr. Cooper cites *Georgia v. Ashcroft*, 539 U.S. 461 (2003) to point out that the "any part" definition is "an appropriate Census classification to use in most Section 2 cases" (footnote 3, page 6 of Mr. Cooper's report). By this definition, during the period from 2011 to 2013, estimates of the United States Census Bureau indicate that African Americans make up around 51 percent of the voting-age population in the Ferguson-Florissant School District, while non-Hispanic whites make up 47.4 percent. In some Section 2 cases, it is appropriate to combine Hispanics and African Americans to obtain a measure of minority voting-age population. This figure indicates a minority VAP of 52 percent in the Ferguson-Florissant District. Finally, if all people reporting multiple races are deemed minorities, the minority VAP is 52.6 percent.

7. The downside of using the most recent data is that they are based on a sample rather than a full count. For this reason, when producing its population estimates, the census department creates an estimate of sampling error. I am not able to reproduce this process in order to estimate the margin of error for estimates in the columns of the right side of Table 1 that involve summing over categories, but due to the sample size, it is possible that the lower bound of the confidence interval of the estimate for "Any-part African American as a share of voting-age population" overlaps slightly with the that of the upper bound of the confidence interval for "White-alone non-Hispanic as a share of the voting-age population."

8. However, one can gain some confidence that the difference between white and minority VAP is not a product of sampling error if one examines the over-time trend in the last several 3-year ACS estimates. While the African-American voting-age population estimates

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have been steady—fluctuating up and down by only a few hundred, the white voting-age

population has been tumbling by a stunning average of 1,895 whites with each of the most recent

estimates. This amounts to a decline of over 7 percent every year. For this reason, district-wide

census counts from 2010 are not useful for assessing current population counts. Even the most

recent ACS estimates are rapidly becoming obsolete, and there is no reason to believe that this

trend has suddenly slowed. Thus the African-American voting age majority in the summer of

2015 is surely considerably higher than that reported in Table 1.

SINGLE-MEMBER DISTRICTS

9. Mr. Cooper proposes two districting plans, each of which contains three districts where

African Americans make up clear majorities of the voting-age population, and three districts

where whites make up clear majorities. Each of these districts also contains a seventh district

that, like the Ferguson-Florissant School District as a whole, has a very small African-American

majority. Given the distribution of whites and African Americans displayed in Figure 4 of the

initial Rodden report, and the fact that voting-age African Americans were almost at parity with

whites in the 2010 census data that Mr. Cooper uses for his calculations, it is not surprising that

he was able to craft a seventh district in each plan with a slim African-American majority in the

integrated Eastern section of Florissant along the New Halls Ferry corridor.

10. Mr. Cooper's report does not, however, address the crucial question of whether the

expected representation of African Americans would be enhanced by the replacement of the at-

large system with one of these districting schemes. According to the *Gingles* approach, there are

already three minority-preferred candidates on the School Board. Furthermore, African-

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American candidates received majorities of the district-wide vote in each of the last two elections, and were it not for an inefficient vote split among them, would hold a decisive majority of seats. The question is whether it is better for African Americans to have a slim but growing overall voting-age majority in the at-large district, or to have a voting-age majority in four of seven individual seats, where the majority is quite slim in the fourth seat.

11. Given the lack of cohesion displayed by African-American voters in elections for the Ferguson-Florissant School Board, it is not at all clear that a slim African-American majority of the voting-age population—or for that matter even a large majority of the voting-age population—would translate into victory for African-American candidates at a lower level of geographic aggregation. In Rodden's initial report, African-American candidates in several recent elections failed to achieve majorities of the vote in precincts with African-American voting-age populations in excess of 80 percent. Thus we should not accept on faith the presumption that African-American candidates would win majorities in winner-take-all clusters of precincts just because they have African-American voting-age majorities.

12. Rather than assume this, we must come up with a way to assess the probability of victory for African-American candidates in the districts that Mr. Cooper has proposed. Our approach is to infer this based on what we know from past elections. We use the data at our disposal from past elections and estimate an empirical model that predicts the overall vote share of African-American candidates based on the electoral participation of African Americans. This model tells us, based on past experience, the way in which the presence of African American voters translates into vote shares for African-American candidates. We can then use that model to calculate a predicted vote share for African-American candidates in each of the districts that Mr. Cooper has proposed. Since the Plaintiffs propose winner-take-all districts, we must then

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count up the districts in which the predicted vote share of African-American candidates is above 50 percent.

13. Our simple statistical model is based on observations of each election held in the years 2000 to 2004, 2006, and 2011 to 2015 (11 elections). The dependent variable in this model is the combined vote share of all African-American candidates. The independent variable is the estimated share of the electorate that is African American in each election (from the ecological inference analysis in the initial Rodden report). The least-squares regression model is as follows:

$$\textit{Black Candidate Share} = 0.187 + 0.525 * \textit{Black Share of Turnout}$$

14. Now that we have an understanding of the translation of African-American voters into votes for African-American candidates, we are ready to make predictions about Mr. Cooper's two districting plans. To do so, we must estimate the level of African-American turnout within each of the proposed districts. We use the precinct-level estimates of African-American and white turnout from the ecological inference analysis presented in the initial Rodden report, and allocate the estimates to individual census blocks within each precinct according to the census block's voting-age population. We assume even turnout across each census block within a given precinct. Next, we use the block assignment files provided by Mr. Cooper to the Defendant's attorneys, and assign each of these blocks to one of Mr. Cooper's proposed districts. We are then able to aggregate up from the blocks to create estimates for African-American turnout within each district for each election.

15. We then use the model described above to generate the predicted vote share for African-American candidates in each district. Since African-American turnout varies considerably from one year to the next, we can use the precinct-level estimates for different years
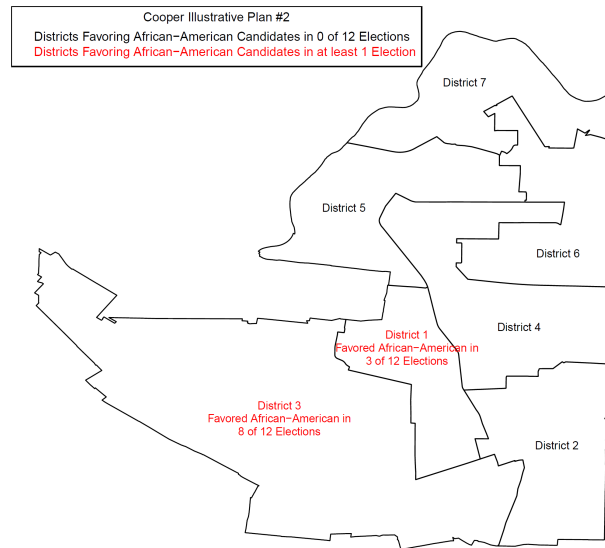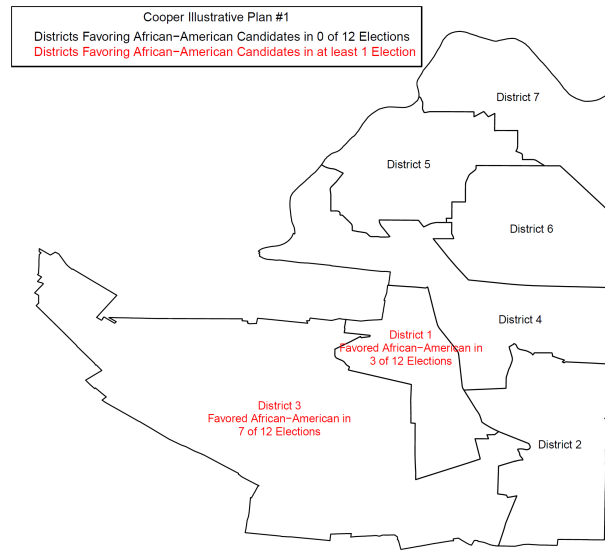
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to examine what the model would predict in years of relatively high African-American turnout, like 2012 through 2014, and in years of low turnout, like 2011 and 2015. These results are presented in Table 2 below. The results can also be visualized with the maps in Figure 1, which point out the specific proposed districts that are likely to produce victories by African-American candidates.

16. In the high-turnout years of 2012 through 2014, the model predicts that African-American candidates would win two seats—both in the Southern tier of the district. However, in lower turnout years the prediction is one or even zero.

Table 2: Using OLS model predictions (At-large OLS model with 11 observations; using black share of turnout to predict share of votes cast for black candidates)

	Number of districts that would have favored an African-American candidate over a white candidate in past elections (Predicted via OLS model using Af. Am. turnout)	
	Cooper Illustrative Plan #1	Cooper Illustrative Plan #2
2000 School Board Elections	0	1
2001 School Board Elections	0	0
2002 School Board Elections	0	0
2003 School Board Elections	1	1
2004 School Board Elections	1	1
2006 School Board Elections	0	0
2009 School Board Elections*	1	1
2011 School Board Elections	0	0
2012 School Board Elections	2	2
2013 School Board Elections	2	2
2014 School Board Elections	2	2
2015 School Board Elections	1	1

* No African-American candidates were running in 2009. This election was not included in the empirical model, but it is nevertheless sensible to report model predictions based on turnout.

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Cooper Illustrative Plan #1

Districts Favoring African−American Candidates in 0 of 12 Elections
Districts Favoring African−American Candidates in at least 1 Election

District 7

District 5

District 6

District 4

District 1
Favored African−American in
3 of 12 Elections

District 3
Favored African−American in
7 of 12 Elections

District 2

Cooper Illustrative Plan #2

Districts Favoring African−American Candidates in 0 of 12 Elections
Districts Favoring African−American Candidates in at least 1 Election

District 7

District 5

District 6

District 4

District 1
Favored African−American in
3 of 12 Elections

District 3
Favored African−American in
8 of 12 Elections

District 2

Figure 1: Districts with Predicted Victories of African-American Candidates

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17. The purpose of this analysis is not to shed light on the existing multi-winner system, where the vote threshold for elections is well below 50 percent and varies from one election to another. Rather, our intention is to use the best available information—past voting for African-American candidates and past turnout of African Americans— to examine whether victories of African-American candidates would be achieved within winner-take-all districts. The estimates may seem surprisingly low, but they are reflections of the fact that African-American voting behavior has often not been cohesive, even in the overwhelmingly African-American precincts. There is little reason to believe that chopping the School District up into smaller winner-take-all districts would change that.

18. In fact, there are good reasons to believe it might hurt. Unlike the jurisdictions targeted in typical VRA cases, the minority population in the Ferguson-Florissant School District is not especially concentrated in a minority-majority neighborhood or region. Rather, it is dispersed throughout a suburban landscape that is exceptionally integrated by American standards. Thus the at-large system has been useful for African-American candidates who wish to appeal to the geographically dispersed set of politically active African-American parents with an interest in the policies under the purview of the school board.

19. This can be seen in the data from any recent School Board election. Figure 2 displays the geographic distribution of support for the most successful African-American candidate, Ms. Graves, and the most successful white candidate, Mr. Ebert, in the most recent Ferguson-Florissant school board election. Each green dot corresponds to a vote for Ms. Graves, and each orange dot corresponds to a vote for Mr. Ebert.

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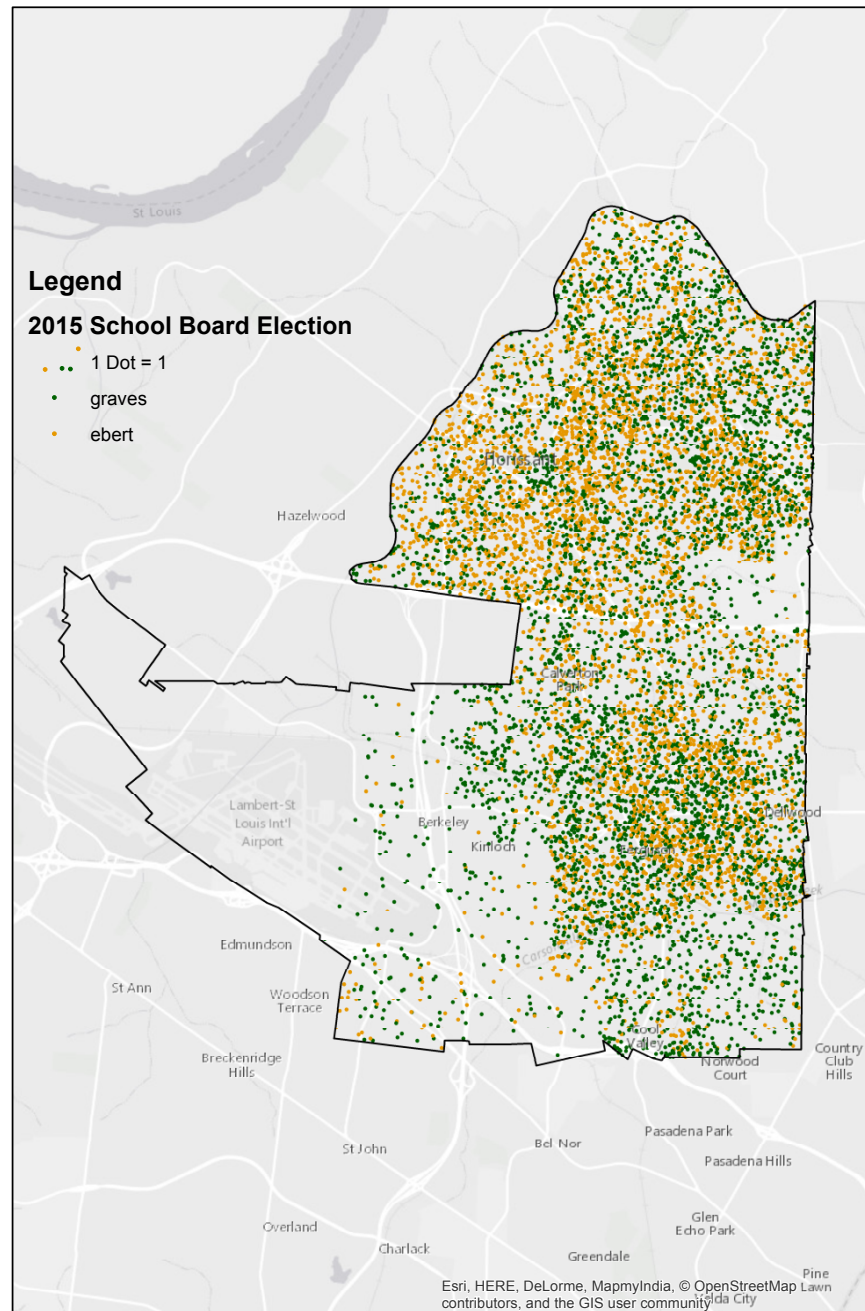
Figure 2: The geographic distribution of support for winning African-American and white candidates

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20. Figure 2 reveals that Ms. Graves obtained support throughout the district. Her support was not especially concentrated in her own neighborhood in Florissant, nor did it come exclusively from the overwhelmingly African-American neighborhoods in Berkeley, Kinloch, Southern Ferguson, and Cool Valley. As revealed in the initial Rodden report, her support was correlated with the presence of African American voters, but not very strongly so.

21. Mr. Ebert's support was also quite geographically dispersed, though somewhat less so than Ms. Graves' because of his relative concentration in Florissant precincts. To quantify this, we can calculate a gini coefficient. Gini coefficients are familiar from the study of income inequality, and are often used to quantify the extent to which income is equally dispersed across individuals or neighborhoods, or the extent to which it is concentrated in a small number of individuals or neighborhoods. This index is also useful for examining the geographic distribution of votes across precincts or districts.[1]

22. We calculate a gini coefficient for Ms. Graves' votes and for Mr. Ebert's votes. A gini coefficient of zero would indicate perfect equality, such that the candidate's votes were equally distributed across all of the precincts in the Ferguson-Florissant School District. A gini coefficient of one would indicate that all of the candidate's votes were concentrated in a single precinct. The gini coefficient for Ms. Graves is .417, and for Mr. Ebert it is .456, indicating that his support was more geographically concentrated than that of Ms. Graves. If we look beyond these individual candidates and examine the combined votes of all African-American candidates and all white candidates, the gini coefficients are .412 and .425 respectively.

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[1] See Ernesto Calvo and Jonathan Rodden. "The Achilles Heal of Plurality Systems: Geography and Representation in Multiparty Democracies," *American Journal of Political Science* February 2015.

23. This is not an isolated feature of the 2015 election. We have calculated cross-precinct gini coefficients for the top African-American candidate and the top white candidate in each of the School Board elections since 2000. These gini coefficients are plotted graphically over time in Figure 3, with African-American candidates displayed in green and white candidates in orange.
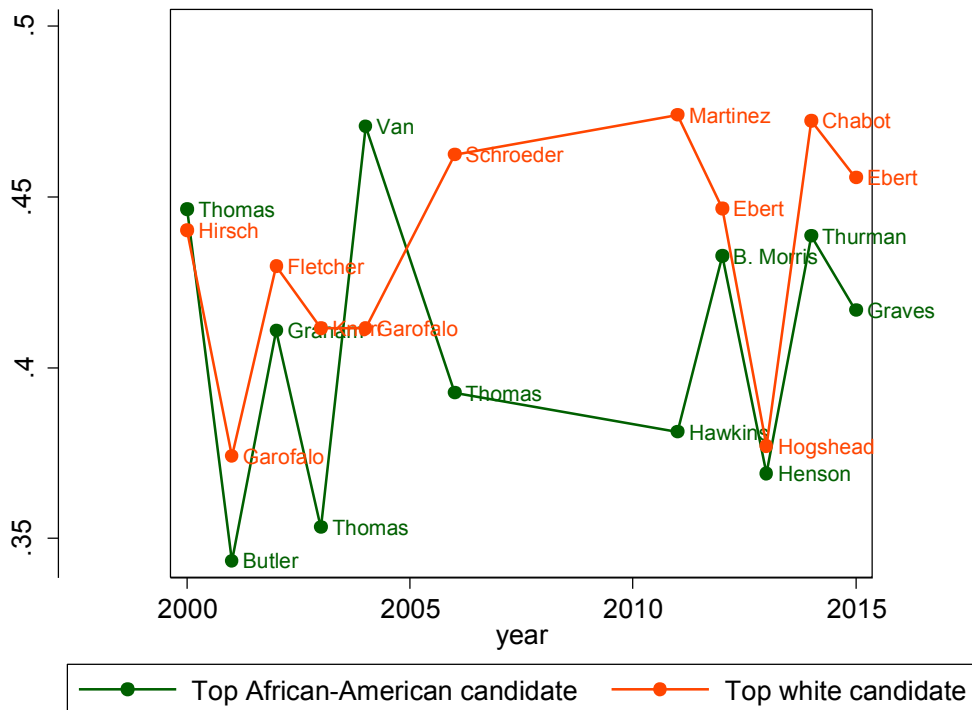
Figure 3: Cross-precinct *gini* coefficients for the top African-American candidate and the top white candidate in each FFSB election since 2000

We have also calculated these coefficients using the combined votes of all African-American candidates and all white candidates in each election. These are displayed in Figure 4.
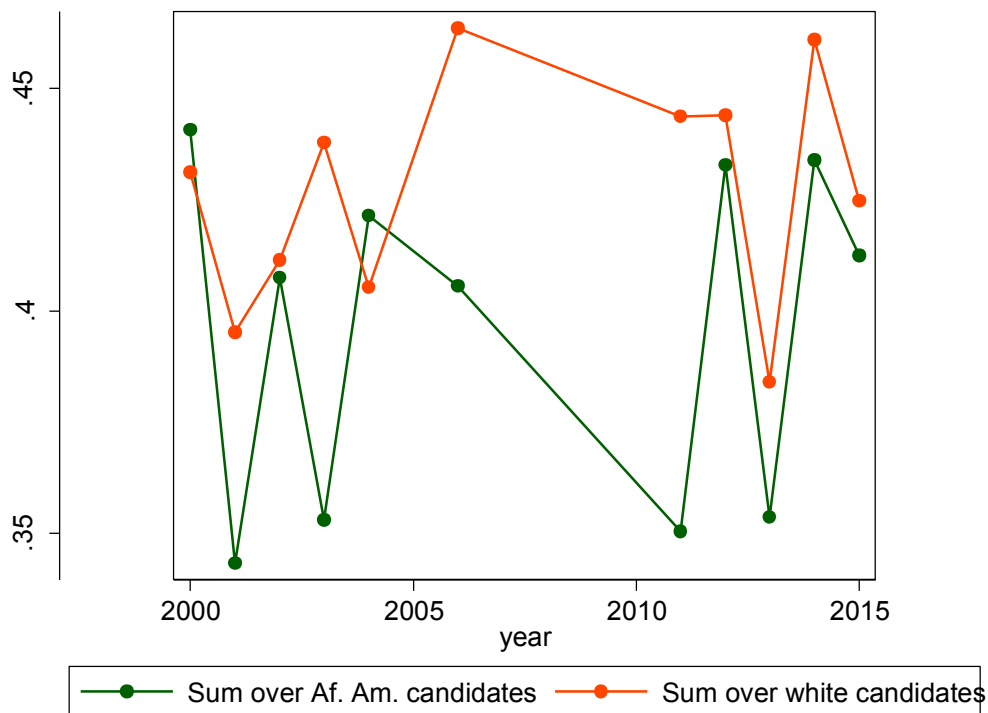
Figure 4: Cross-precinct *gini* coefficients for the combined vote totals of African-American and white candidates in each FFSB election since 2000

24. Both graphs tell a similar story. With only a couple of exceptions early in the 2000s, African-American candidates tend to have a more geographically dispersed support distribution than white candidates. This is exactly the opposite of the circumstance envisioned by the Supreme Court in *Gingles*, and an important part of the reason why a transition to single-member, winner-take-all districts is not expected to benefit African-American candidates in Ferguson-Florissant. Now that whites are a minority of the voting-age population and the group whose candidates have a relatively concentrated support distribution, they are the group that is more likely to benefit from the imposition of a districting plan like one of those offered by Mr. Cooper.

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25. Moreover, under Mr. Cooper's plans, the existing African-American incumbents would be forced to adopt a very different strategy in order to stay in office. In Mr. Cooper's first plan, they have been placed in the same district and would be forced to compete against each other so that one would be forced off the board. In the second of Mr. Cooper's plans, Ms. Graves would compete in a district that is almost 60 percent white. Neither of these districts emerged as predicted African-American victories in the analysis based on our historical regression model.

26. Another concern with the transition to single-member districts is candidate recruitment. At-large seats are sometimes not contested by any African-American candidates even under the current system, in which candidates can run from any neighborhood and there are usually only two seats open in a given year. It might be difficult to recruit many candidates simultaneously, with each meeting residency requirements in each of the seven districts.

27. In conclusion, there are no clear expected benefits from the imposition of a single-member electoral system like one of those proposed in Mr. Cooper's report, and the risks are substantial. The greatest risk is that it would dilute the voting power of the geographically dispersed African-American majority.

28. Should additional documents or information be provided to us to review and analyze, we reserve the right to take these additional materials into account, modify and/or supplement our opinions, as well as to offer new opinions.

We declare under penalty of perjury under the laws of the United States that the foregoing is true and correct to the best of our knowledge, information, and belief.

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Executed in Palo Alto, CA and Ann Arbor, MI on July 2, 2015.

Jonathan Rodden

Jowei Chen

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